

REMARKS

This paper responds to the Office Action mailed on August 9, 2006.

Claims 1, 9, 16, 26, and 31 are amended, no claims are canceled, and no claims are added; as a result, claims 1-40 and 71-73 are now pending in this application.

Information Disclosure Statement

Applicant submitted a Supplemental Information Disclosure Statement and a 1449 Form on May 5, 2006. Applicant notes that reference 6,687,146 was not initialed with the other references. Applicant respectfully requests that an initialed copy of the 1449 Form be returned to Applicants' Representatives to indicate that the cited references have been considered by the Examiner.

§112 Rejection of the Claims

Claims 1-4, 8-20, 24-27, 30-40 and 71-73 were rejected under 35 U.S.C. § 112, first paragraph, as lacking adequate description or enablement.

Claims 1-4, 8-20, 24-27, 30-40 and 71-73 were rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness.

Applicant amended claim 1 to clarify that “a portion of a buried conductive path” and “a region of the selective epitaxy mesa adjacent to the buried conductive path” indicate “a doped region”. Similarly, Applicant amended claims 9, 16, 26, and 31.

These amendments are adequately supported by the specification, for example, page 11, lines 10-17. Thus, Applicant believes that the rejections under 35 U.S.C. § 112 first and second paragraphs to claims 1-4, 8-20, 24-27, 30-40 and 71-73 are overcome.

§102 Rejection of the Claims

Claims 1-4, 8-11, 16-18, 24-27 and 71-73 were rejected under 35 U.S.C. § 102(b) for anticipation by Fitch et al. (U.S. 5,451,538).

To sustain an anticipation rejection under 35 USC § 102(b), each and every element in a rejected claim must be taught or suggested in the cited reference.

Applicant respectfully traverses the 35 USC § 102 based rejections.

Regarding independent claim 1:

Applicant amended claim 1 as follows:

1. A memory cell, comprising:

a vertical access device including a selective epitaxy mesa, wherein the selective epitaxy mesa comprises a doped region being in contact with a buried conductive path laterally, the doped region of the selective epitaxy mesa includes a laterally non-graded dopant profile consisting essentially of dopant of one conductivity type; and
a storage device on the selective epitaxy mesa.

Referring to Fig. 10 of Fitch relied on by the Action, it can be seen that Fitch discloses a vertical FET device, wherein a channel region 30 is formed of a first conductivity type, conductive layer 18 is a gate electrode, dielectric layer 22 is the gate dielectric, and the channel region 30 between gates 18 can be used for controlling current flow between drain electrode 28 (col. 4, line 42-45) and source electrode 32/34 (col. 5, line 9 and 29-30). There is no direct current flow between conductive layers 18 and channel region 30 because of the existence of dielectric layers 16, 20, and 22. The drain electrode 28 is in contact with the top surface of a diffusion 14.

The Office Action alleges that “region 30” of Fitch corresponds to “doped region” of claim 1 and “region 30” includes a laterally non-graded dopant profile consisting essentially of dopant of one conductivity type. Applicant disagrees with the allegation. From Fig. 10 of Fitch, it can be seen clearly that, in contrast to the amended claim 1 of the invention, “region 30” of Fitch, separated by the drain electrode 28, is not in contact with the alleged buried conductive path 14 at all, while the “doped region” of claim 1 is in contact with the buried conductive path laterally.

Furthermore, Applicant submits that “drain electrode 28” of Fitch does not correspond to “doped region” of claim 1 either. From Fig. 10 of Fitch, it can be seen clearly that, in contrast to the amended claim 1, “drain electrode 28” of Fitch does not laterally contact with “diffusion 14” (the alleged buried conductive). Additionally, Applicant cannot find any part of Fitch teaching that “drain electrode 28” includes a laterally non-graded dopant profile consisting essentially of dopant of one conductivity type, which is positively recited in amended claim 1.

Therefore, Applicant submits that Fitch does not teach or suggest a “doped region” of claim 1, which is in contact with a buried conductive path laterally, and includes a laterally non-graded dopant profile consisting essentially of dopant of one conductivity type. Accordingly, Applicant submits that claim 1 is not anticipated by Fitch.

Regarding independent claims 9, 16, 26, and 31:

For at least the substantially similar reasons discussed for claim 1, Applicant submits that claims 9, 16, 26, and 31 are not anticipated by Fitch.

Regarding claims 2-4, 8, 10-11, 17-18, 24-25, 27 and 71-73

Claims 2-4, 8, 10-11, 17-18, 24-25, 27 and 71-73, directly or indirectly, depend on independent claims 1, 9, 16, 26, or 31 respectively. Therefore, for at least the substantially similar reasons discussed for claim 1, Applicant submits that these dependent claims are not anticipated by Fitch.

Thus, Applicant respectfully requests the examiner to withdraw the rejections to the above claims under 35 USC § 102(b).

§103 Rejection of the Claims

Claim 30 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Fitch et al. (U.S. 5,451,538) in view of Kurjanowicz et al. (U.S. Publication 2002/0131291).

Claims 31-40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fitch et al. in view of Chew et al. (U.S. 6,518,622).

To sustain a 35 USC § 103(a) rejection, each element of a rejected claim must be disclosed in the proposed combination of the cited documents as set forth in the Office Action.

Applicant respectfully traverses the 35 USC §103 based rejections.

Regarding to claim 30:

Depending from claim 26, claim 30 has a feature “the first source/drain region of the selective epitaxy mesa includes a laterally non-graded dopant profile consisting essentially of dopant of one conductivity type.” However, neither Fitch nor Kurjanowicz teaches such feature of claim 30. Therefore, Applicant submits that, even combined, Fitch and Kurjanowicz do not disclose each element of claim 30, accordingly do not render claim 30 obvious. Thus, Applicant respectfully requests the examiner to withdraw the rejections to claim 30 under 35 USC § 103(a).

Regarding to claim 31:

Applicant amended claim 31 as follows:

31. A vertical transistor, comprising:

a vertical, selective epitaxy body extending from a horizontal substrate;

a first doped region in the body adjacent the substrate, the first doped region laterally contacts a buried bit line, and includes a laterally non-graded dopant profile consisting essentially of dopant of one conductivity type;

a second doped region in the body remote from the substrate;

an undoped intermediate region between the first doped region and the second doped region; and

a gate at least partially surrounding the intermediate region.

The Action admits that, in contrast to claim 31, the intermediate region (channel region) of Fitch is doped.

The Action relies on Fig. 10 of Fitch to refer to a first doped region 28 in the body adjacent the substrate, a second doped region 32/34 in the body remote from the substrate, an intermediate region 30 (channel region), and a gate surrounding the intermediate region 30, and the Action asserts that region 28 is electrically connected to region 14. However, in contrast to claim 31, it can be seen clearly from Fig. 10 that Fitch does not teach that the first doped region 28 laterally contacts the region 14 (the buried bit line). Furthermore, in Fitch, Applicant cannot find any teaching or suggestion that the first doped region 28 includes a laterally non-graded dopant profile consisting essentially of dopant of one conductivity type, as is positively recited in claim 31.

The Action does not state any part of Chew teaches or suggests that the first doped region is in contact with a buried bit line laterally, and includes a laterally non-graded dopant profile consisting essentially of dopant of one conductivity type, as is positively recited in claim 31.

Therefore, Applicant submits that, even if combined, Fitch and Chew do not teach each of the elements recited in claim 31, thus do not render claim 31 obvious. Thus, Applicant respectfully requests the examiner to withdraw the rejection to claim 31 under 35 USC § 103(a).

Regarding to claim 32-40:

Claims 32-40, directly or indirectly, depend on independent claim 31. Thus, for at least the same reasons discussed for claim 31, Applicant submits that, even if combined, Fitch and Chew do not teach each of the elements recited in claim 31, thus do not render claims 32-40 obvious. Thus, Applicant respectfully requests the examiner to withdraw the rejections to these dependent claims under 35 USC § 103(a).

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 349-9587 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

TERRENCE C. LESLIE

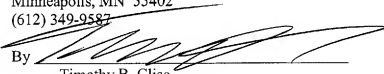
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Date

11 Oct '06

By


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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 11 day of October 2006.

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